

The latest changes to the space shuttle manifest are listed in handy chart form. Chart on Page 3.



These prototype boots will be made in-house for walking on the Moon or Mars. Photo on Page 4.

Space News Roundup

Vol. 30

February 22, 1991

No. 8

Cracks in hinge supports threaten launch

By James Hartsfield

Discovery's STS-39 launch will wait in the wings, although no one knows how long, as engineers attempt to troubleshoot cracks found early this week in hinge supports on the spacecraft's two fuel line doors.

Basically, there are three options for *Discovery*. First, if analysis and tests show it's safe, the spacecraft could be launched as is. Second, a repair could be performed at the launch pad. Third, *Discovery* could be rolled back to the Vehicle Assembly Building (VAB), taken off the external tank and solid rocket boosters, and moved into its processing hangar for extended repairs. There was no leading option among the three as of Thursday.

Since the cracks were discovered, work toward the launch has proceeded uninterrupted, including the Terminal Countdown Demonstration Test, a dress rehearsal of the launch countdown performed by the crew and launch controllers, completed Wednesday.

Engineers may decide to perform a test on *Columbia* to aid them in choosing the proper course of action. The test will modify the support on one hinge of *Columbia's* fuel line doors to simulate the effect of an almost total loss of the cracked supports on *Discovery*. If *Columbia's* doors are not hampered in closing without the support, it may

show that the problem on *Discovery* is less severe than it appears.

The test will try to determine if the doors would work even if there were an almost complete failure of the cracked area. If the test on

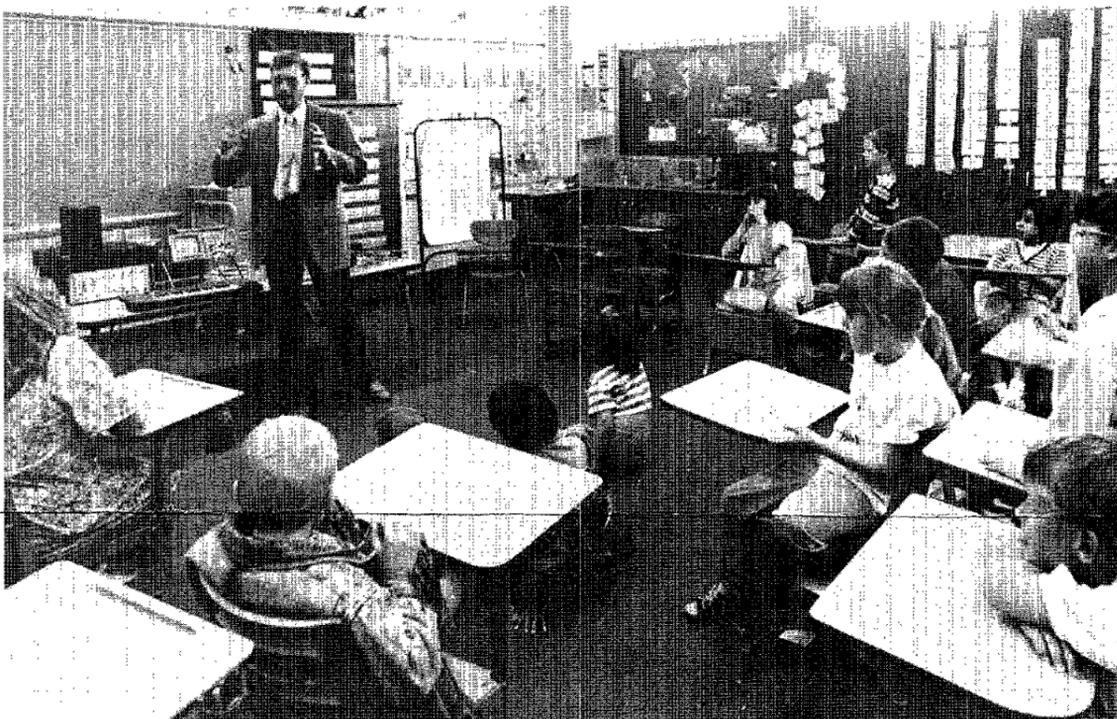
Columbia is performed, it is not expected to interfere with preparations for that spacecraft's May launch on STS-40.

The tile-covered orbiter umbilical doors are latched outward during launch to allow the fuel lines from the external tank to connect with the orbiter at the two 17-inch-disconnects. Following separation of the orbiter and external tank about 8 minutes into

the launch, actuators close and seal the hinged doors to protect the cavity from the heat of reentry.

Three cracks have been found on *Discovery*, two of which appear to be much more significant than the third. The two larger cracks are in a one-eighth-inch-thick metal plate on which supports are mounted for one part of the hinge assemblies. Each door has two such hinges, one forward and one aft. On the left door only one has a support area crack. On the same support on the right door, one large crack is apparent. On the right door's other hinge, there is a very small crack in the same area that shows no signs of stress or growth.

Please see **DISCOVERY**, Page 4



JSC Photo by Benny Benavides

JSC engineer Chatwin Lansdowne answers one of many questions posed by the students in this second grade class at College Park Elementary School. Lansdowne, a student himself at Wichita (Kan.) State University, was among more than 150 JSC engineers who talked to students in classrooms throughout the Houston area.

JSC engineers share wonders in classrooms

By Pam Alloway

JSC engineer Chatwin Lansdowne had barely walked into the second grade classroom at College Park Elementary School when two arms shot into the air.

"I heard about NASA on my TV," said 8-year-old Derrick Hayden.

"How old are you?" chimed in classmate Liliana Hernandez, also 8 years old.

Those were the first of a myriad of questions the 18 youngsters had for Lansdowne throughout his one hour demonstration of sound wave patterns. Lansdowne was one of more than 150 JSC engineers who taught classes in 10 area school districts as part of National Engineers Week. College Park Elementary School is in Deer Park but is part of the LaPorte Independent School District.

Being in a classroom is old hat to Lansdowne although the classrooms he's accustomed to house larger desks. This is his third term as a coop student at JSC and away from his home base in Wichita, Kan. Lansdowne is working on a master's degree in engineering at Wichita State University. His current term at JSC began in January and will end in August.

Using a trumpet, a keyboard, and a microphone, Lansdowne demonstrated how sound waves change their patterns depending upon the sounds being made. The demonstration proved an instant hit with the restless youngsters who were as enthralled with talking into a microphone as they were with the oscilloscope that showed the sound wave

patterns.

"Sound is a vibration," Lansdowne told the class. "Put your fingers on your throat and say something and you can feel vibrations."

Eighteen faces lit up as the students grasped their throats and "felt" sound.

Lansdowne, who works in the Tracking and Communications Division of the Engineering Directorate, told the youngsters that people in his office work on the shuttle's radio equipment. He also talked about communication satellites.

"For instance, if we wanted to talk to someone in China who is on the other side of the world, we don't have telephone cables that reach that far so we use satellites," Lansdowne said.

"What's engineering?" asked one student.

"Engineers take science and apply it to hopefully make life better," Lansdowne said. "I use a lot of math and science in my job."

Dawn Lewis, who teaches the second grade class, said she enjoyed the talk as much as her students.

"I explained what engineering was in a very general way," Lewis said. "The kids were definitely looking forward to this."

Earlier that day Tom Costello, another JSC engineer who also works in Engineering's Tracking and Communications Division, visited Janelle Barclay's second grade class. Costello talked to the students about engineering and how underwater activities could relate to space.

"I also tried to get them thinking about inventing things and that

Please see **ENGINEERS**, Page 4

Space-age learning tools available

Although NASA has been sending humans into space for more than 30 years, space flight is still new to middle school children and basic questions are very much on their minds.

With the help of the astronaut corps and a number of other organizations, NASA is producing space-age learning tools to relate space flight and other scientific concepts to teachers and students at all grade levels and subject areas.

JSC Director Aaron Cohen and the STS-41 crew previewed the first of these products for employees Tuesday. "Space Basics," the first in a new

series of "Liftoff to Learning" educational video products, was shown in Teague Auditorium.

"It is especially appropriate to release this video during National Engineers Week, when NASA engineers from coast to coast are going into schools to promote our education goal of encouraging students from elementary through graduate school to prepare themselves for careers in science, engineering and technology," Cohen said in introducing the preview.

"Space Basics" was videotaped on location at JSC, Kennedy Space

Center, and in orbit on STS-41. The 21-minute video combines the answers to basic questions about orbital science with exciting space photography and colorful special effects.

"Hopefully, it's the start of a long line of these types of videos that we can use to help educate the young folks in our country," said Chief Astronaut Dan Brandenstein.

Accompanying the tape is an eight-page video resource guide for teachers that provides background information on rockets and orbits as

Please see **LEARNING**, Page 4

Why wait?

No traffic jam at second gate

By Kelly Humphries

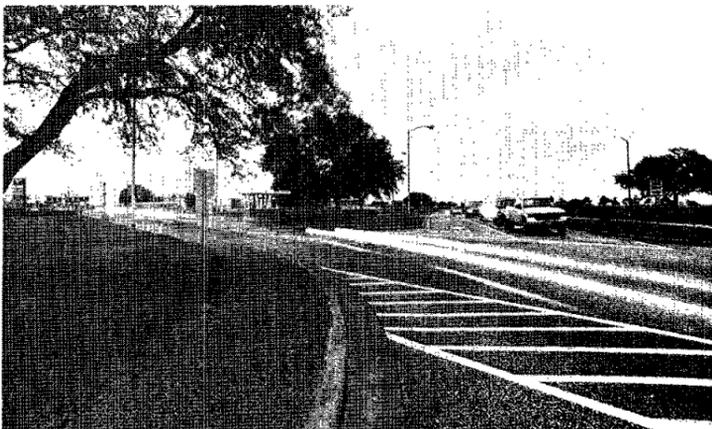
JSC Security Operations Branch Chief Bob Gaffney can't explain it, but JSC employees apparently would rather wait in line at the center's main gate than drive right in through the next NASA Road 1 gate.

Security began opening the second NASA Road 1 gate at 6:45 a.m. about three weeks ago in an effort to alleviate early morning traffic tie-ups at the main gate.

But Gaffney says the congestion hasn't eased since the second gate began opening early.

Gaffney encourages drivers to break out of their early morning habit and use the Third Street gate — across NASA Road 1 from Upper Bay Rd. — when the left turn lane at the main gate is backed up. There is one restriction, he said: Employees entering through the Third Street gate must be in a car with a valid vehicle pass.

If there is a reason employees prefer using the main gate, Security would like to know about it. Call Charlyne Minick at x34068 if you'd like to comment on the early morning main gate traffic.



JSC Photo by Robert Markowitz

As this photograph shows there's no waiting at the second NASA Road 1 gate that now opens at 6:45 a.m. Employees at the stop sign are those who have waited to enter through the main gate.

Pool earns Rotary 1991 Stellar Award

Dr. Sam Pool, chief of the Medical Sciences Division, is one of four people selected for the 1991 Stellar Awards sponsored by the Rotary National Award for Space Achievement Foundation.

The Stellar Award honorees are selected annually for their contributions to the space program throughout their careers. Award recipients will be recognized at Feb. 28 banquet at which JSC Director Aaron Cohen will receive the National Space Trophy.

Pool was honored for his work in identifying many of the medical problems associated with the weightlessness of space, according to the announcement.

Please see **POOL**, Page 4

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.

- General Cinema (valid for one year): \$4 each.
- AMC Theater (valid until May 1991): \$3.75 each.
- Loew's Theater (for use two weeks after movie's premiere): \$4.
- Rockets vs. 76ers (7:30 p.m. March 9, Summit): \$5.50
- Thermographed, raised lettering and logo business cards can be ordered by civil service employees, 250 cards per set. Old logos-\$21; new logos-\$18.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must show badge or EAA card and pay at the Gilruth Center. Classes tend to fill up four weeks in advance. For more information, call x30301.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30-9 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m., April 20 and May 18. Cost is \$15.

Aerobic dance—Eight-week session meets 5:15-6:15 p.m. Tuesday and Thursday nights. Cost is \$24.

Exercise class—Class meets 5:15-6:15 p.m. Monday and Wednesday nights. Cost is \$24.

Weight safety—Required course for employees wishing to use the Gilruth weight room. The next class will be from 8-9:30 p.m. Feb. 28. Cost is \$4.

Country and western dance—Intermediate class meets Monday nights for six weeks beginning March 4. Cost is \$20.

Personal safety—Brief lecture on personal safety awareness. Talk begins at 5 p.m. March 13 in the Gilruth Center ballroom.

Ballroom dance—Eight-week class will feature beginner and advanced instruction from 7-8:15 p.m., and intermediate instruction from 8:15-9:30 p.m. Thursdays, beginning March 7. Cost is \$60 per couple.

Softball sign-ups—Softball league sign-ups will be the week of Feb. 25. Call the Gilruth for details.

JSC

Technical Library News

These new publications are available in the JSC Technical Library, Bldg. 45, Rm. 100.

The Mind's Eye: Readings from Scientific American. BF241 .M56 1986.

The Psychology of Achievement (sound recording). Brian Tracy, 1984. BF637.S8 .T72 1984.

Oceanography from the Space Shuttle. University Corporation for Atmospheric Research and the Office of Naval Research, U.S. Navy, 1989. GC10.4.A8 033 1989.

JSC

Swap Shop

Property

Rent: room in house w/full privileges, clean, quiet, 20 min to NASA, \$270/mo. Eric, x38420 or 484-9179.

Sale: LC, Meadowbend, new sect of subdiv, 3-2-2, ex cond, pool, deck, patio cover, extras, 10% assum, \$75.8K. John Gilman, 280-7461 or 538-2072.

Rent: Lake Livingston, waterfront, 3-2, C/AH, FPL, covered deck, pier, new cond, furn, wk/wknd, 482-1582.

Sale: Bay Knoll, 4-2-2, 2599 sq ft, formal, gameroom, family room, cul-de-sac, \$159K. 480-5473.

Lease: Heritage Park new sect, 3-2-2, formal DR, lg kitchen w/breakfast area, FPL, fenced, \$675/mo avail 3:20, no pets. x35021 or 486-6084.

Sale: Ellington/Sycamore Valley, 3-2-2, corner lot, lg stor shed, tall fen w/wide gate, new paint/floors, \$62.5K. Bill, x30164 or 481-6340.

Sale: LC, Britany Bay, 4-2-2-2, many extras, \$107K w/assum 8% loan bal of \$82K. 332-0047.

Sale/lease: Friendswood, custom 3-2-2 on lg, fenced, wooded lot, gas/elect, breakfast rm, FPL, new carpet, flooring, paint, sale \$78K or lease \$875/mo 992-1338.

Sale: Bay Glen, 3-2-2, 2050 sq ft, great room, formal DR, study w/French doors, upgrades, assum loan, \$122.5K. 480-0527.

Sale: Pipers Meadow, 3-2-2-2, formal LR/DR, FPL, loft, wet bar, fans, gar door opener, deck, landscaped, new paint, 15 min to JSC. \$92K. Dennis, x34405 or 480-5076.

Rent: Galveston condo, modern, bright, 2-1, FPL, all appl, new carpet, walk to beach, 69th St. rent \$495/mo w/lease or \$350/wk, or \$255/wknd. 488-2664.

Sale: Pearland, Dixie Hollow subdiv lot for medium density homes, x39530 or 482-5003.

Rent: West Galveston beach house, 3-2, A/C, day/wk. Ed Shumlak, x37886 or 326-4795.

Sale: Near Columbus, west of Houston, 2 houses on 2 acres, 2 car garage/workshop, 14 x 80 mobile/kennel, barn, garden, new septic and butane, \$40K, poss owner finance. (409) 234-3496.

Sale: Heritage Park, 3-2-2, ex cond, fenced, FPL, fans, new schools, 1540 sq ft, \$69K or \$65K assum. Roy, 482-6985.

Rent: Lake Travis cabin, private boat dock, C/A-H, fully equip, accom 8, wkly/dly \$325/\$80. 474-4922.

Rent/lease: Clear Lake condo on marina, three level, all appl, FPL, wetbar, 2-2-2-2, \$950/mo. 474-4922.

Lease: Pasadena duplex, near JSC, 3-1-5, new carpet, paint and blinds, no pets, no W/D connection, \$400/mo. 996-0152.

Sale: Pearland, Shadycrest subdiv 3/4-acre lot, all util, trees, \$27.5K. 992-1913.

Rent: Friendswood area, enclosed RV storage stall, 40' deep, lights/pwr, reasonable rate. 482-9396.

Cars & Trucks

'89 Mustang, new tires, new interior, complete front end work w/new many new parts; runs good, BO. Scott, x39032 or 554-2206.

'87 Chevy Cavalier, white 4 dr, auto, A/C, 385 mi, ex cond, 20+ mpg city, warr, \$4300 OBO. Dave, x39879 or 482-6187.

'81 T-Bird, A/C, PS, PB, cruise, AM/FM/cass, runs good. \$1000 Bob, 283-4146.

'84 Ford Van, XLT Club Wagon, loaded, new tires, extra clean, \$6800. 482-1582.

'85 Monte Carlo, metallic gray over silver, 4.3L FI, pwr steering, brakes and locks, cruise, stereo, gauge and trim pkg, ex cond. Dennis, x39012 or 554-4233.

'81 Honda Accord, silver, 4 dr, A/C, AM/FM/cass, new tires, brakes and battery, ex cond, \$2000. x34227 or 333-1855.

'80 Olds Cutlass, 6 cyl, 2 dr, auto., ex cond, \$2000. 286-5305.

'86 300ZX, ex cond, auto., T-top, loaded, 95K mi, \$7740. x30643 or 488-4373.

'89 Ford F350 PU, diesel, supercab, dually, fully customized, ex cond. (409) 925-5881.

'80 Pontiac Phoenix, V6, A/C, 5 dr liftbk, new auto and batt, runs good, no dents. \$1950. x30092 or 481-3637.

'71 Volvo 1800E professionally restored eng, new tires, needs paint. x30153 or 941-6575.

'86 Honda Prelude, 5 spd, sunroof, tinted windows, AM/FM/cass, new tires and brakes, \$6K. x31237 or 488-8614.

'85 Buick Regal, AM/FM/cass, good tires, \$2000. x32987.

'86 Chevy PU, \$700. '80 Honda Accord, 2 dr, good cond,

\$1200. x31883.

'88 Chevelle, 6 cyl, 100K mi, regularly maintained, current safety insp, needs paint and new interior, \$1000 OBO. Ed, 283-5716 or 333-1563.

'90 Toyota Tercel sedan, auto., 2 dr, teal color, tinted windows, loaded, ex cond. x32016.

'87 Toyota Celica GT, white, 3 dr hatch, A/C, auto., 4 spkr AM/FM stereo, 48K mi, ex cond, \$8200 nego. 639-3455.

'82 4WD Jeep Eagle Wagon limited, 6 cyl auto, pwr windows, locks, 73K mi, \$3000 nego. x34213 or 286-7149.

'84 Camero, V6, auto., A/C, tu-tone blk, 51K mi, ex cond, \$3750. x37108 or 486-8463.

'83 Chevy PU, V8-283, ex cond, auto, dual exhaust, carpet, AM/FM, other rebur. Billy, x38501 or (409) 938-4979.

'78 Chrysler Le Baron station wagon, 53K mi, leather int, ex paint, imitation wood sides, roof rack, sm model, \$2500.

'89 Camero RS, blue tinted windows, grey interior, new tires, 51K+ mi, \$8500 OBO. 996-9646 or 996-1678.

'86 Buick Regal Ltd, V8, 2 dr, all pwr, loaded, ex cond, 70K mi, \$5200 OBO. 282-4041 or 337-2318.

'87 Toyota Supra, like new cond, 47K mi, 5 spd, high perf stereo, equalizer, CD changer, subwoolers, 8 Boston Acoustics speakers, paging alarm, \$19K. Tim, x34333 or 486-6143.

'81 Camero Z28, approx 80K mi, white w/red & blk int, white ext w/red pinstripe, \$2000. Lea, 554-2364.

'38 Dodge Salesman coupe, all parts, rebuilt engine, flat 6cyl, \$5000. 335-6978 or (409) 948-0241.

'83 Honda Prelude, 5 spd, sunroof, ex cond, 87K mi, one owner, \$3500. B. Craig, x32388 or 1-420-2936.

'87 Ford Taurus, auto., A/C, new tires, AM/FM stereo, low mi, \$4550 OBO. 578-7118 or 929-7334.

'82 Toyota Celica Supra, 92K mi, new tires, brakes, exhaust, loaded, \$2000 OBO. 474-4084.

'82 Ford Anaheim Custom Van, P/S, P/B, tilt, cruise, AM/FM stereo, CB, 4 caps, bed, 2 A/C, 2 tanks, BO. 488-3191.

'85 Cadillac Sedan DeVille, 63K mi, ex cond, it blown metallic, tan leather, Voque tires, wire wheels, \$7500. Mike, 333-6821 or 332-6917.

'85 Toyota Celica GT, auto., loaded, \$3800 OBO. '85 Honda CRX, 5 spd, loaded, \$3850 OBO. 940-5005.

Cycles

'84 Kawasaki GPZ 750 motorcycle, 8K mi, super clean, \$2000. Shannon, x32646 or 484-5412.

Lady's 21.5" Terry racing bike, computer, pump, helmet, light, lock, ex cond, was \$686 now \$300. Wayne, x34337 or 326-4832.

Lady's 24" Raleigh Summit bike, 12 spd, quick release front wheel, extras, new cond, \$125. Cadie, x38222.

Boats & Planes

Bass fishing rig, 15' Tidcraft boat w/trlr, 50hp Merc and Super Motolguide trolling motor, rigged w/w/dry storage, carpet, front seat steering, \$1200 OBO. Phil, x38805 or 488-4452.

'83 Renken 18' sailboat, roller furling jib, 4hp aux, galv trlr, sleeps 4, good cond, \$4000. 339-3476.

'82 Glastron 17' boat, open bow, 80hp Merc, sport trlr, all covers and skis, \$3850 OBO. 929-7334 or 578-7118.

New 25hp Evinrude, elec start, \$1700. Jerry Craig, 283-5311 or 420-2936.

'72 30' Morgan sailboat, new diesel eng, \$17.5K OBO. Bill, 283-5384 or 326-1880.

Audiovisual & Computers

Letter quality daisy wheel printer, 30 CPS, very low usage, ex cond, \$100 OBO. Phil, x38805 or 488-4453.

X1 turbo, 640K, 20 MB HD, 5.25" FD, coprocessor, mono monitor, extra CGA card, SW, \$500. Speier, 333-2263.

IBM XT computer, 640K, 30 MB HD, 2 FD, color Taxan monitor, \$975; Intel 386 inboard for IBM or Compaq, 1 MB, Intel warr, was \$895, now \$375. x30092 or 481-3637.

Zenith 286 computer, 1 MB RAM, math coprocessor, 20 MB HD, 2 FD, EGA, monochrome monitor, \$600; Epson LO dot matrix printer, \$150; Minilab stat SW, full version, \$150. x37137 or 482-8966.

Modems, 2400 baud, \$65; 2400 MNP level 5, \$125, both less than 6 mo. old. Mike, x37525 or 996-0089.

PC SW, Xtree Gold 1.0, 5.25" and 3.5" disks, file viewers, text search, supports ARC, split windows, etc, \$35. x30852.

Fisher Studio Standard CR-W49 stereo double cassette deck, \$50; Fisher CA-274 100 W stereo amp/tuner, needs

Today

AFCEA meets—The Armed Forces Communication and Electronics Association Houston Space Chapter will meet at 11:30 a.m. Feb. 22 at the Lakewood Yacht Club, 2425 NASA Road 1. Bill Huffstetler, manager of JSC's New Initiatives Office, will speak. For more information, call Veronica Mullins or Tammy Williams at 283-7342.

Supercomputer conference—Jon Erickson, chief scientist in JSC's Automation and Robotics Division, will be a featured speaker at a Supercomputer Leadership Conference on Feb. 22 in Houston. The conference is sponsored by the Quantitative Technology Corp. Research Institute and the Oregon Advanced Computing Institute. For more information contact Catherine Verrenti (503) 626-3081.

Cafeteria menu—Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans.

Monday

Cafeteria menu—Special: hamburger steak. Entrees: beef Burgundy over noodles, fried chicken. Soup: cream of chicken. Vegetables: buttered corn, carrots, green beans.

Tuesday

BAPCO meets—The Bay Area PC Organization will meet at 7:30 p.m. Feb. 26 at the League City Bank & Trust. For more information call Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

Cafeteria menu—Special: turkey and dressing. Entrees: baked meatloaf, liver and onions, barbecue spare ribs. Soup: beef noodles. Vegetables: Spanish rice, broccoli, buttered squash.

Wednesday

Laptop showcase—The Information Systems Directorate will sponsor a notebook laptop showcase from 10 a.m.-4 p.m. Feb. 27 in Bldg. 12, Rms. 112, 254 and 256. For more information call the Product Demonstration Facility at x37572.

Astronomy seminar—The JSC Astronomy Seminar will be held at noon Feb. 27 in Bldg. 31, Rm. 129. For more information contact Al Jackson 333-7679.

BANN program—The Bay Area NAFE (National Association of Female Executives) Network will present a program and luncheon buffet at 11:30 a.m. Feb. 27, at the South Shore Harbour Country Club. Al Garza will discuss self-defense and give demonstrations. Cost is \$10 members, \$12 non-members. Program only cost is \$3 members, \$5 non-members. Reservations deadline is Feb. 22. For information contact Sharon Westerman, x68927, or Wanda Spain, x31025.

Cafeteria menu—Special: Spanish macaroni. Entrees: broiled fish, tamales with chili. Soup: seafood gumbo. Vegetables: ranch beans, beets, parsley potatoes.

Thursday

Space Trophy banquet—The National Space Trophy will be formally presented to JSC Director Aaron Cohen at the Rotary National Award for Space Achievement Foundation's annual banquet at 8 p.m. Feb. 28 at the Houston Hyatt Regency-Downtown. Retired Lt. Gen. Thomas Stafford, former astronaut and now head of the Outreach Program for the Space Exploration Initiative, will speak. For more information contact John Francis or Dana Heard at 333-5986.

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Rent: Friendswood area, enclosed RV storage stall, 40' deep, lights/pwr, reasonable rate. 482-9396.

work, \$10. Brad, x37999 or 474-5609.

Zenith 22" console color TV, \$130; 13" color TV, \$65. x49691.

Complete Atari ST computer system w/1MB RAM, 20 MB HD, Spectra 128 Mac emulator, 360K and 720K FD, Lattice C, Wex, Sensible Grammar, sell all or part. all for \$900. 992-3302.

Digital printer, 4 yrs old, good cond. Sheryl, 643-8336 or 484-5547.

Macintosh 512 enhanced, 800K FD, \$400. 280-8796.

Musical Instruments

Fender Squire Stratocaster guitar, ex cond, \$200. Peavey Studio Chorus 210 amp, ex cond, \$300. x38004 or 996-6929.

Sequential Circuits 72 key keyboard and Peavey KB-100 amp, both for \$600. Derrick, x36059 or 332-2796.

Lost & Found

Blue bicycle, circa 1950, front wheel smaller than rear wheel, w/large basket on front, has letters PAO on side. Please return to Bldg 2 PAO. Is vital to mission operations and support.

Pets & Livestock

Springer spaniel pups, mother excellent hunter, \$50. 326-2460.

Sm animal carry-on kennel, meets all airline specs, \$10. Shane, x35916 or 326-2344.

Baby hand-fed cockatiels, very sweet. Linda, 484-7834.

AKC reg cocker spaniel puppies, \$125 and up. 331-7953.

Registered exotic miniature Vietnamese pot bellied pigs, \$300-\$2000/ea. exotic doves and finches, \$5/ea. James, 335-6710 or 482-6744.

Two 7-wk old reg miniature dachshund pups, chocolate wired, \$250/ea. 534-2676.

Easter bunnies, pick out now, take home now or later, \$10 incl feed and inst. Gailo, 554-6200.

1 yr old Lab free to good home, ex w/children, all shots, incl x-lg doghouse. 992-2560.

Free mixed breed fem puppy, approx 10 mo. Lea, 554-2364.

AKC collie puppies, born 1/4/91, sable/white, \$200. 333-4734.

AKC cocker spaniels, black, black/tan, m/f, \$150-\$200. (409) 925-1819.

Mixed spitz puppies. 282-4686 or 333-9216.

Personal

SPACE SHUTTLE MANIFEST

Mission Date	Orbiter	Payload	Inclination	Altitude	Duration	Crew CDR	PLT	MS	PS
39 March	Discovery	AFP-675 IBSS STP-01 MPEC	57°	140	8	Michael L. Coats	L. Blaine Hammond, Jr.	Guion S. Bluford, Jr. Gregory J. Harbaugh Richard J. Hieb Donald R. McMonagle Charles Lacy Veach	
37 April	Atlantis	GRO CETA APM-02	28.5°	243	5	Steven R. Nagel	Kenneth D. Cameron	Jay Apt Linda M. Godwin Jerry L. Ross	
40 May	Columbia	SLS-01 GAS BRIDGE	39°	160	9	Bryan D. O'Connor	Sidney M. Gutierrez	James P. Bagjan Tamara E. Jernigan Rhea Seddon	F. Drew Gaffney Millie Hughes-Fulford
43 July	Discovery	TDRS-E SSBUV-03, SHARE II, OCTW-01, TPCE	28.5°	160	9	John E. Blaha	Michael A. Baker	James C. Adamson G. David Low Shannon W. Lucid	
44 August	Atlantis	DSP, IOCM	28.5°	195	10	Frederick D. Gregory	Terence T. Henricks	F. Story Musgrave Mario Runco, Jr. James S. Voss	Thomas J. Hennen
48 November	Discovery	UARS APM-03	57°	292	7	John O. Creighton	Kenneth S. Reightler, Jr.	Mark N. Brown James F. Buchli Charles D. "Sam" Gemar	Roberta L. Bondar Ulf D. Merbold
42 December	Atlantis	IML-01 IMAX-05 GAS BRIDGE	57°	160	7	Ronald J. Grabe	Stephen S. Oswald	PLC Norman E. Thagard Manley L. Carter, Jr. William F. Readdy	
46 March	Discovery	TSS-01 EURECA-1L IMAX-06 EOIM-III/TEMP2A-03	28.5°	160	7	Loren J. Shriver	James D. Wetherbee	PLC Jeffrey A. Hoffman Andrew M. Allen Franklin R. Chang-Diaz Claude Nicollier	TBD (Italy)
45 April	Atlantis	ATLAS-01 SSBUV-04	57°	160	7	Charles F. Bolden	Brian Duffy	PLC Kathryn D. Sullivan C. Michael Foale David C. Leestma	Michael L. Lampton Byron K. Lichtenberg
49 May	Endeavour	INTELSAT-VI-R ASEM	28.5°	198	8	Daniel C. Brandenstein	Kevin P. Chilton	Thomas D. Akers Richard J. Hieb Bruce E. Melnick Kathryn C. Thornton Pierre J. Thuot	
50 June	Columbia	USML-01	28.5°	160	13*	Richard N. Richards	John H. Casper	PLC Bonnie J. Dunbar Kenneth D. Bowersox Carl J. Meade	TBD TBD
51 August	Atlantis	ACTS CANEX-02 DXS	28.5°	160	8				
47 September	Endeavour	SL-J GAS BRIDGE	57°	160	7	TBD	TBD	PLC Mark C. Lee N. Jan Davis Mae C. Jemison TBD	Mamoru Mohri
52 September	Columbia	LAGEOS II EURECA-1R USMP-01 ASP	28.5°	160	9				
53 November	Discovery	DOD							
54 January	Endeavour	SPACEHAB-01 ORFEUS-SPAS GAS BRIDGE SHOOT	28.5°	160	7				
55 February	Columbia	SL-D2	28.5°	160	9				
56 March	Discovery	TDRS-F DEE CTM	28.5°	160	5				
57 April	Endeavour	ATLAS-02 SPTN-02 SSBUV/A-01	57°	160	9				
58 May	Atlantis	SRAD/TPITS WSF-01 IEH ISEM-01	28.5°	160	7				
59 June	Columbia	SLS-02	28.5°	160	13				
60 July	Discovery	SPACEHAB-02 OAET-01, CAPL FLOATZONE-01 PL OPPTY	28.5°	160	7				
61 August	Endeavour	USMP-02 SPTN-03 CMSE-01 PL OPPTY	28.5°	160	9				

Fiscal Year '94				Fiscal Year '95				Fiscal Year '96			
1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR
LITE	CRISTA-SPAS	IML-02	SFU-RETR	SRL-02	ATLAS-04	AAFE	USMP-04	SPACEHAB-06	SRL-03	GEOSTAR-03	SSF/MB-05
SPAS-III	ATLAS-03	USMP-03	CXM-03	XTE	WISP	OAET-02	WSF-03	SPTN-05	SLS-03	SPACEHAB-07	ATLAS-05
FTS-DTF-01	SSBUV/A-02	OAET-FLYER	CMSE-02	EUV RE TR	SSBUV-A-03	SL-D3	SSF/MB-01 (FEL)	CXH-10	SSF/MB-03	OAET-03	SSBUV-A-04
SRL-01	GEOSTAR-01		WSF-02		USML-02			SSF/MB-02		SSF/MB-04	CONE
HST REV-01	SPACEHAB-03		SPACEHAB-04		SPACEHAB-05					USMP-05	
	FROZEPIPE		EURECA-2L		GEOSTAR-02					WSF-04	
	WPE		CMX-04		EURECA-2R					DCWS	
	MICROWAVE-01				CMSE-03						
	SPTN-04										
	ISEM-02										
	CXM-02										

Glossary

AAFE Aeroassist Flight Experiment	EUVE Extreme Ultraviolet Explorer	SL Spacelab
ACTS Advanced Communications Technology Satellite	FLOATZONE Office of Commercial Programs Experiment	SHOOT Super Fluid Helium On Orbit
AFP Air Force Payload	FROZEPIPE Office of Commercial Programs Experiment	SLS Space Life Sciences
AMOS Air Force Maui Optical Station	FTS-DT Flight Telerobotic Servicer Demonstration Test Flight	SPACEHAB Commercially owned pressurized experiment module
APM Ascent Particle Monitor	GAS Getaway Special	SPAS Shuttle Pallet Satellite
ASME Assembly of Station by EVA Methods	GEOSTAR Interactive Radiodetermination Satellite	SPTN Shuttle Pointed Autonomous Research Tool for Astronomy
ASP Altitude Sensor Package	GRO Gamma Ray Observatory	SRAD Shuttle Radiator Assembly Demonstration
ATLAS Atmospheric Laboratory for Applications and Science	HPE Heat Pipe Experiment	SRL Space Radar Laboratory
CANEX Canadian Experiment	HST Hubble Space Telescope	SSBUV Shuttle Solar Backscatter Ultra-Violet Instrument
CAPL Capillary Pump Loop Experiment	IBSS Infrared Background Signature Survey	SSF/MB Space Station Freedom Manned Base
CETA Crew and Equipment Transfer Aid	IEH International Extreme-UV Far-UV Hitchhiker	SSS Satellite Servicer System
CMSE Candidate Materials Space Exposure	IMAX Large format motion picture camera	STARLAB DOD Spacelab
CONE Cryogenic Orbital Nitrogen Experiment	IML International Microgravity Laboratory	STP Space Test Program
CREAM Cosmic Radiation Effects and Activation Monitor	INTELSAT International Telecommunications Satellite Organization	TDRS Tracking Data Relay Satellite
CRISTA Cryogenic Infrared Spectrometer Telescope for Atmosphere	IOCM Interim Operational Contamination Monitor	TPCE Tank Pressure Control Experiment
CTM Collapsible Tube Mast	ISEM ITA Standardized Experiment	TPITS Two Phase Integrated Thermal System
CXH Commercial Cross-Bay Carrier	LAGEOS Laser Geodynamics Satellite	TSS Tethered Satellite System
CXM Commercial Cross-Bay for Materials Science Laboratory	LITE Lidar In-Space Technology Experiment	UARS Upper Atmosphere Research Satellite
DEE Dexterous End Effector	MICROWAVE Office of Commercial Programs Experiment	USML U.S. Microgravity Laboratory
DOD Department of Defense	MPEC Multi-Purpose Experiment Canister	USMP United States Microgravity Payload
DSP Defense Support Program	OAET Office of Aeronautics, Exploration and Technology	WISP Waves in Space Plasma
DXS Diffuse X-Ray Spectrometer	OCTW Optical Communication Thru Shuttle Window	WSF Wake Shield Facility
EOIM Evaluation of Oxygen Interaction with Materials	ORFEUS Orbiting and Retrievable Far and Extreme Ultraviolet Spectrometer	XTE X-Ray Timing Explorer
EURECA European Retrieval Carrier	SATCOM GE communications satellite	
	SFU Space Flyer Unit	
	SHARE Space Station Heat Pipe Advanced Radiator Experiment	

* Dependent on prior long duration flight experience.

Bluford finalist for Black Engineer of Year

Astronaut Guion S. Bluford Jr., a member of the STS-39 crew, has been named a finalist for the 1991 Black Engineer of the Year Award.

Bluford, an Air Force colonel, is among four finalists for the title presented annually by U.S. Black Engineer Magazine, Mobil Corp. and the Council of Engineering Deans of the Historically Black Colleges and Universities.

The winners will be announced during a national television special March 2 from the Baltimore Convention Center.

Bluford earned a bachelor of science degree in aerospace engineering from Pennsylvania State University, a master's and a doctorate in aerospace engineering from the Air Force Institute of Technology, and a master's in business administration from the University of Houston-Clear Lake.

JSC

People

McKay earns honors for technical communication

Mary Fae McKay, Ph.D., has been elected an associate fellow in the Society for Technical Communication.

She was cited for her distinguished work in the field of technical communication and for her willingness to share her expertise.

McKay, currently finishing a NASA publication called "Space Resources" designed to substantiate NASA's bid to carry out the Space Exploration Initiative,

works in JSC's Solar Systems Exploration Division. She joined JSC 11 years ago in the Center Operations Directorate's Publications Branch, and worked in the Mission Operations Directorate's Training Division.

The Society for Technical Communication, an international organization of more than 15,000 members, designates only 3 percent of its members as associate fellows and only 100 have been so named in its 40-year history.

Lister earns CPA

Susan E. Lister of JSC's Pricing and Labor Relations Branch has successfully passed all five parts of the Texas State Board of Certified Public Accountants examination.

The official designation of CPA will

be conferred by the board in November.

Lister has been a member of the Pricing and Labor Relations Branch in the Procurement Support Division since February 1990. She is a 1988 graduate of Texas A&M University and a member of the National Contract Management Association's Space City Chapter.

Lineberry memorial established

A memorial in the name of Edgar C. Lineberry has been established to



Bluford

McKay

Lister

benefit the Challenger Center.

Lineberry, manager of Mission Development and Operations for the Lunar and Mars Exploration Program Office, died Jan. 31.

Donations may be given to Norma Dell'Osso, Beverly Yell or Faye Conway in Bldg. 17, Rm. 248, or mailed to the Edgar C. Lineberry Fund, Clear Lake National Bank, 16211 Space Center Blvd., Houston, TX, 77062.

Picnic to wave stars, stripes theme in May

The JSC Picnic Committee has chosen "A Stars and Stripes Picnic" as the theme for this year's family-oriented get-together at the Gilruth Center.

This year's picnic will be from 11 a.m.-5 p.m. May 4.

The theme was suggested by Charlotte Ober, a flight activities assistant in the Aircraft Operations Division. Ober won a round trip airline ticket to anywhere in the continental United States, a picnic T-shirt and free picnic tickets.

A record 206 theme suggestions were submitted this year, said Melody Goss, picnic committee chair.

At the same meeting, the USO was selected as the charity that will receive proceeds of the picnic dunk tank competition among directorates.

The next meeting of the picnic committee will be at 5 p.m. March 6 in the Gilruth Center, Rm. 204. Anyone who wishes to attend is welcome.

JSC Blood drive set

The first on-site JSC Blood drive will be from 8-11:30 a.m. and 1-3:30 p.m. Thursday at the Gilruth Center.

Helon Crawford, coordinator, encouraged employees to donate, and urged them to make appointments in advance. Appointments are required so that the technicians available are sufficient to meet donor demand, she explained.

Appointment may be made by calling Crawford at x34159, Mary O'Rear at x36531, or Dan Mangieri at x33003.

Three earn Silver Snoopy

Three outstanding JSC employees received the coveted Silver Snoopy Award during January.

The lapel pins and certificates, presented by members of the astronaut corps, are given to less than one percent of the total NASA and contractor work force each year. Silver Snoopy Awards signify outstanding contributions to NASA's flight safety and mission success.

January's winners were: Barney H. Corbin, Photographic and Television Technology Division; Frances M. Smith, Office of the Director; and Lt. Col. Jan C. Larson, Space Shuttle Operations Integration Office.

Showcase to allow laptop comparisons

Computer users will get a chance to "slam the doors and kick the tires" on laptops from 20 different manufacturers Wednesday.

The Information Systems Directorate is sponsoring a Notebook Laptop Showcase from 10 a.m. to 4 p.m. in the Product Demonstration Facility, Bldg. 12, Rm. 112, and the Bldg. 12, Rm. 254/256 conference room.

Altima, Advanced Logic Research, AST, Compaq, CompuAdd, Dell Everex, For, GRiD, Poqet, Samsung, Sharp, Texas Instruments, Toshiba, Twinhead and Zenith will demonstrate their laptop computers side by side.

For details, call the PDF at x37572.



PROTECTIVE PROTOTYPE—Willie Warson works on a protective sole that eventually could become part of a boot for astronauts exploring other planets. Warson, an ILC Space Systems Division technician, is part of a team that is developing and fabricating prototype space suit equipment for future lunar and Mars missions. The work by the EVA Branch in Engineering's Crew and Thermal Systems Division is being done in JSC's Bldg. 7A as part of NASA's Space Exploration Initiative.

JSC Photo

Engineers share their enthusiasm with youngsters

(Continued from Page 1)

inventions can be simple things too," Costello said. "For instance, we talked about whether sand castles were easier to build with dry sand or wet sand and why."

College Park Elementary School Principal Marv Risner said the school's 36 teachers had requested a JSC engineer visit each of their classrooms. There are 639 students at the school, kindergarten through fifth grade. The school has an aero-

space program for its fifth graders in which teachers present information on the space program. One of the fifth grade program's highlights is a model rocket launch.

"We're calling on expertise at the ground level," Risner said. "We want to provide our kids with an opportunity to see there are occupations that are exciting and which rely on getting a good education."

Engineer astronauts Mary Cleave and Bonnie Dunbar also were among the JSC group who visited schools this

week.

Cleave talked to about 100 fifth grade students Wednesday at Red Bluff Elementary School in Pasadena. Dunbar will teach a class today at Carter G. Woodson Middle School in Houston.

This was the first year the JSC Education Office coordinated the engineering speakers program and Norma Kersman, JSC education specialist and event coordinator, said she was pleased with the overwhelming interest.

"I originally thought we'd get 50 engineers to volunteer and we got 150," she said. "But thinking about how JSC responds in situations designed to help education, the turnout really doesn't surprise me."

Engineers hailed from the following areas (by mail codes): AA (AH), CA, DA, EA, IA, JA, NA, SA, VA and TA. JSC engineers visited the following school districts: Houston, LaPorte, Pasadena, Clear Creek, Friendswood, Pearland, Dickinson, Alvin, North Forest and Goose Creek.

Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Editor Kelly Humphries
Associate Editors Pam Alloway
Kari Fluegel

Discovery waits in wings until cracks understood

(Continued from Page 1)

Engineers believe that the metal offsets and becomes uneven when the doors are opened, but evens out when the doors are closed. Scratches on the metal exposed by the cracks lead the engineers to believe the cracks have been through numerous door openings and closings.

After inspecting similar areas on *Atlantis* and *Columbia*, the metal

plates appeared to be superficially weakened from normal use. No cracks were found on *Atlantis*, and on *Columbia* two slight cracks, not comparable to *Discovery's*, were seen. The cracks on *Discovery* are believed to have been caused by an abnormal stress on the areas, although technicians are uncertain when that stress may have occurred. One possibility is a problem docu-

mented in July at KSC. During processing, *Discovery's* right door failed to close properly because a loose nut jammed the door.

While engineers troubleshoot the cracks and possible repairs, processing at Launch Pad 39A was expected to proceed. Late Thursday evening, hypergolic propellants were to be loaded into the electrical generating system of the spacecraft.

Learning tools draw on space program

(Continued from Page 1)

well as suggestions for hands-on classroom activities. The guide also includes a vocabulary list, reference list and details about the crew members.

For each shuttle mission, a four-page teachers guide, called "Mission Watch," will be produced describing the mission, payloads, experiments, and science objectives, and includes suggested classroom activities and references. At the end of the mission,

a four-page summary report, called "Mission Highlights," will be available to educators.

These new space-age learning products are the result of a team effort involving NASA Headquarter's Educational Affairs Division, the astronaut corps, Space Shuttle Support Office, program and science people, flight directors and planners, television production people and public affairs.

Local educators can contact JSC's Teacher Resource Center at 483-

8696 on how to obtain permanent copies of the "Space Basics" videotape and resource guide (available March 4), "Mission Watch" and "Mission Highlights." With a modem, educators can access NASA Space-

link, a computerized space education data base on 205/895-0028 for all printed education materials. JSC's Film and Video Distribution Library, 486-9606, soon will have copies of the video and resource guide available for loan to teachers.